

PATENT CLAIMS

1. A method for operating an exhaust gas turbocharger serving for charging an internal combustion engine, in which a main flow of a gas is supplied to a compressor of the exhaust gas turbocharger via an intake line, is compressed in the compressor by means of a compressing element and is led via a compressor line into an intake duct of the internal combustion engine, the gas quantity transferred to combustion chambers of the internal combustion engine via the intake duct being regulated by means of a throttle valve arranged between the compressor and the combustion chambers, characterized in that, when a vacuum occurs in the region downstream of the compressing element (52) between the compressing element (52) and the throttle valve (36), as compared with the pressure in the intake line (26) upstream of the compressing element (52), this vacuum is utilized in order to generate a bypass flow (B) which is branched off upstream of the compressing element (52) from the main flow (A) led via the compressing element (52), flows around the compressing element (52) from its side located upstream to its side located downstream and is returned to the main flow (A) downstream of the compressing element (52) and upstream of the throttle valve (36).

2. The method as claimed in claim 1, characterized in that the bypass flow (B) is branched off from the main flow (A) in the intake line (26) downstream of a flowmeter (18) and/or is returned into the main flow (A) again in the region of the compressor line (28).

3. The method as claimed in claim 1 or 2, characterized in that, when the pressure conditions are reversed and excess pressure occurs in the intake line (26) in the region between the throttle valve (36) and the compressing element (52), as compared with the region upstream of the compressing element (52), a flow

through the bypass line (42, 43) from the downstream side of the compressing element (52) to the upstream side of the latter is prevented.

5 4. The method as claimed in claim 3, characterized in that the flow through the bypass line (42, 43) from the downstream side of the compressing element (52) to the upstream side of the latter is prevented by means of at least one regulating element (48).

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5. A device for operating an exhaust gas turbocharger, in which a compressor of the exhaust gas turbocharger is flow-connected upstream to an intake line and downstream to a compressor line, and the compressor line can be connected to an intake duct of an internal combustion engine to form a flow line, a throttle valve being provided in the flow line, comprising a bypass line which can be connected on its first side to the intake line upstream of a compressing element of the compressor and with its second side to the flow line downstream of the compressing element of the compressor, characterized in that, in the assembled state of the downstream-compressing element (52) of the compressor (14), the bypass line (42, 43) is connected to the flow line (34, 32, 28) between the compressing element (52) and the throttle valve (36), and in that said bypass line has at least one regulating element (48) which is designed in such a way that it allows only a flow around the compressing element (52) from its side located upstream to its side located downstream and prevents a flow from the downstream side of the compressing element (52) to the upstream side of the latter.

35 6. The device as claimed in claim 5, characterized in that the regulating element (48) is pressure-controlled, and preferably only the pressure in the intake line (26) in the region upstream of the compressing element (52) and the pressure in the region

between the compressing element (52) and the throttle valve (36) are used for the control.

7. The device as claimed in one of claims 5 or 6,  
5 characterized in that the bypass line (42, 43) is integrated into a turbocharger casing (50).

8. An exhaust gas turbocharger for charging an internal combustion engine, the compressor of which is  
10 flow-connected upstream to an intake line and downstream to a compressor line, the compressor line being connectable to an intake duct of an internal combustion engine to form a flow line, and a throttle valve being provided in the flow line, comprising a  
15 bypass line which is connected on its first side to the intake line upstream of the compressor and is connected with its second side to the flow line downstream of the compressor, characterized in that the bypass line (42, 43) is connected to the compressor line (28) between a  
20 compressing element (52) of the compressor (14) and the throttle valve (36), and in that said bypass line has at least one regulating element (48) which is designed in such a way that it allows only a flow around the compressing element (52) from its side located upstream  
25 to its side located downstream and prevents a flow from the downstream side of the compressing element (52) to the upstream side of the latter.

9. The exhaust gas turbocharger as claimed in  
30 claim 8, characterized in that the at least one regulating element (48) is pressure-controlled, and preferably only the pressures in the intake line (26) in the region upstream of the compressing element (52) and in the region between the compressing element (52)  
35 and the throttle valve (36) act on the at least one regulating element (48) for the control.

10. An internal combustion engine with an exhaust gas turbocharger, characterized in that the exhaust gas

turbocharger (10) is designed according to one of claims 8 or 9.